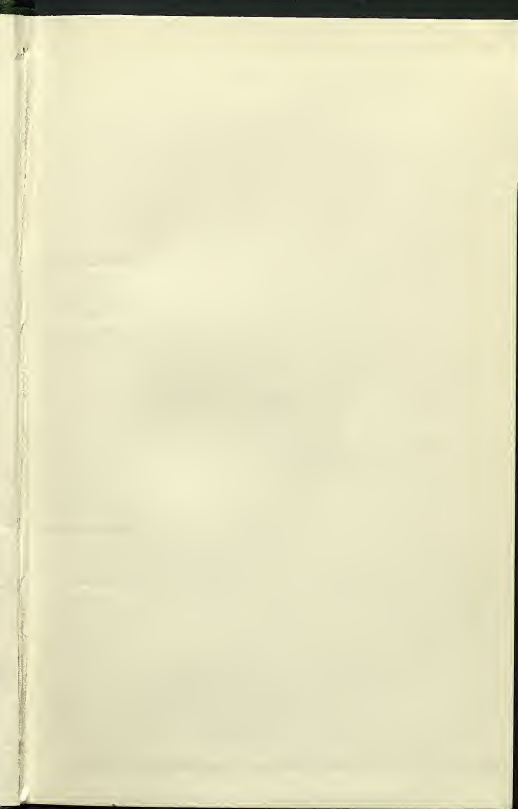


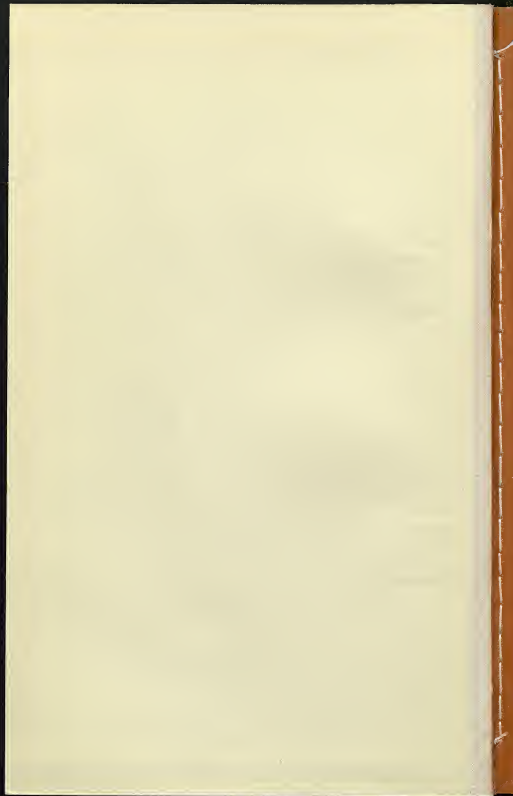
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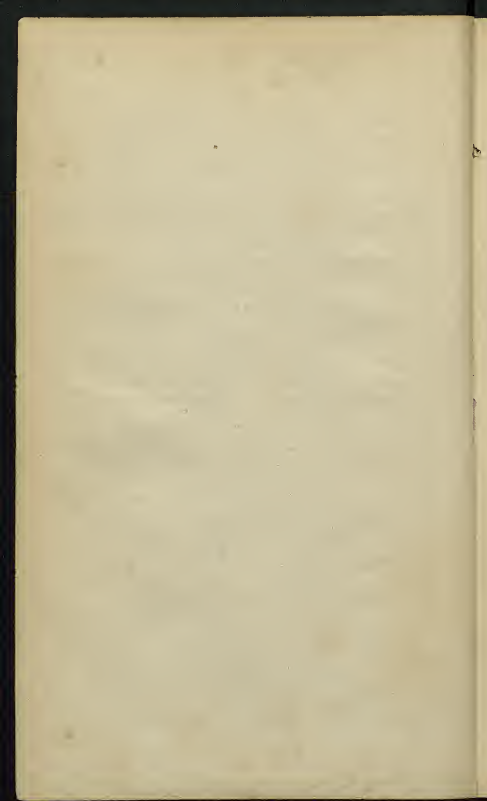
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THE
PATENT SYSTEM
OF
STEEPING AND PREPARING FLAX,
WITH
A REPORT
ON THE
FLAX WORKS OF MESSRS. BERNARD & KOCH,
NEWPORT, COUNTY MAYO.

R. B. SCHENCK,
PATENTEE.

BELFAST:
PRINTED BY FRANCIS D. FINLAY,
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1849.



THE PATENT SYSTEM OF STEEPING AND PREPARING FLAX.

THE Royal Society for the Promotion and Improvement of the Growth of Flax in Ireland having, at their last Annual Meeting, pronounced in favour of the new system of steeping flax in water heated by steam to a certain average temperature, as possessing many and decided advantages over the method actually in use, the patentee is desirous of bringing before landed proprietors, manufacturers, and the public in general, the information which will be found in this pamphlet.

By reference to the Report made to the Committee of the Flax Society, by the Secretary, the peculiar advantages of the system will be understood. The actual commercial value of the fibre, so prepared, has lately been ascertained, by the sale of several lots to Irish, English, and Scotch spinners. The prices obtained, varied from £50 to £74 per ton, while flax grown in the same locality of County Mayo, and treated by the ordinary method, has not averaged more than £30 per ton. It has been found, also, that the yarn spun from this flax, is of excellent quality, and that it boils and bleaches as well as any other.* The superiority of the system having been thus fully recognised by the Royal Flax Society, and the value of the fibre admitted by the spinners, it only remains necessary, that this method should be generally carried out, in order to secure its full benefits to the community.

There are two classes of persons who are especially interested in the adoption of the system,—landed proprietors, and those who have existing establishments which afford facilities for embarking in the business.

The landed proprietors of those districts of the South and West of Ireland, where flax culture has lately been introduced, can, by the erection of steeping vats in connexion with scutch-mills, at once secure the cultivation of the plant on a scale which it would otherwise be years in reaching. The chief difficulty which exists to the extensive culture of flax in such localities, is the necessity of instruction in the details of management, on the care and skill of which the ratio of profit entirely depends.

And of all the operations to which the plant is subjected, in its growth and preparation, none is so difficult and critical as the steeping process; and it is well known, that, even in the North, where flax culture is generally well understood, mistakes are often made in this department, which seriously affect

* See Mr. Crawford's letter, page 12, and Mr. Howie's, page 23.

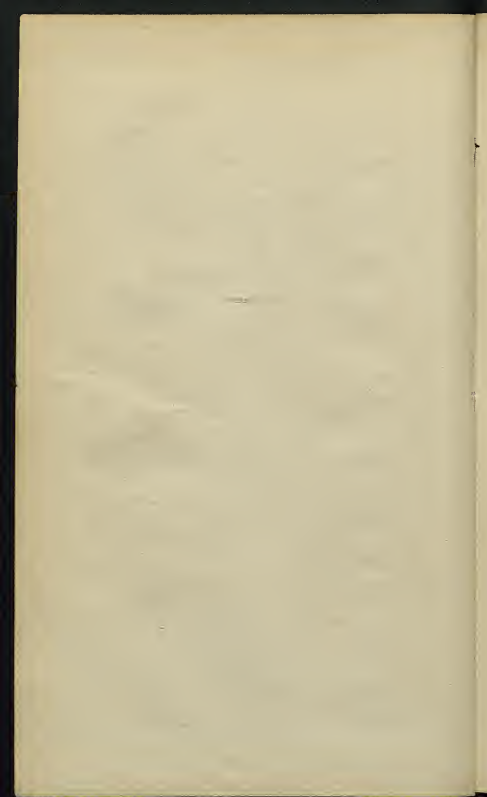
the growers' profits. This arises not only from the critical nature of the steeping, but also, to a great extent, from atmospheric causes. To secure a healthy, uniformly-retted fibre, the process of fermentation should go on regularly and uninterruptedly from its first commencement to its completion. In our variable climate, this cannot always be effected, even with the best management. The patent system, from the uniformity of its operation, reduces to a certainty what was before dependent upon all these causes. It results, therefore, that, if farmers had sale for their flax, just as pulled and dried in the field, they would grow a much larger quantity of it, as the management, up to the maturity of the plant, is sufficiently simple; and as flax is pulled towards the end of July or beginning of August, it would be the first source from which the farmer could realise, while he would be enabled to put in an after crop, on the same land, of rapo, Winter vetches, or white globe turnips.

The recent changes in our laws, by which foreign agricultural produce is brought into direct competition with that of Ireland, has rendered landlords anxious to introduce a more varied system of cropping, and flax has been naturally looked to as partly supplying the void, since Ireland may defy foreign competition in this article. But, from the reasons before stated, the introduction of its culture must be slow, so long as it is necessary that farmers should be instructed in all the details of management. That if the landlords would put up steeping establishments and scutch-mills, they would, at once, secure a large growth of the crop, all the difficulties being thus obviated. An objection may be raised on the grounds, that landed proprietors have neither the time nor the knowledge requisite to enter upon this as a business. Persons practically acquainted with the subject could, however, be readily found, who would manage the concern. And the outlay in the purchase of flax might be very much lessened, by the landlords agreeing to take it in lieu of rent from the tenants, the value being affixed by the manager. This has been done, in some cases, already, and has proved equally satisfactory to landlord and tenant. The fibre, when steeped, dried, and scutched, can be forwarded to Belfast, where it will at once meet with a ready sale through Commission Agents, charging a small percentage; and the seed may be turned to profit in various ways; the heaviest and best can be retained till the next Spring, and given out to the tenants, for sowing. Any quantity of the remainder will find a market with the oil-crushers of Dublin, Belfast, or Liverpool. The value of the seed, as food for all kinds of stock, is so fully established, that it is unnecessary to do more than refer to the Report of the Flax Society, and the publication of Mr. Warnes, of Trimmingham. As regards the profits to be derived from this business, there can be no doubt, that, at present, after paying to the grower what he considers a fair remunerative price for his flax, and working it up in the establishment, from £15 to £20 per ton may be calculated on as a clear profit, over and above all the expenses of the operations.

As regards those parties,—men of business and others, who have scutch-mills, flax or corn mills, spinning factories, or, in fact, any establishment where there is a plentiful supply of water, buildings, or steam power, the addition of vats, &c., could be easily effected, at a small cost. And to these parties, the

profits that might be realised must afford matter for serious consideration, in times like the present, when it is so difficult to find profitable investments for capital.

The patentee is ready to treat with any persons who are desirous of entering upon the business. He invites attention to the establishment, now in full work at Newport, Mayo, and will be ready to give full information as to the details, upon application. Communications addressed to R. B. SCHENCK, Belfast; or, to Messrs. BERNARD & KOCH, Newport, Mayo, will be attended to.



EXTRACT FROM THE ANNUAL REPORT
OF THE
ROYAL SOCIETY
FOR
THE PROMOTION AND IMPROVEMENT
OF THE
GROWTH OF FLAX IN IRELAND.

THE STEEPING OF FLAX.

IN the last annual report, allusion was made to the system of steeping flax, by placing it in vats filled with water heated by steam to a certain temperature; and it was then stated, that attention should be paid to this process, and a future report made upon it. The American patentee, in conjunction with other experienced parties, having commenced operations, on an extensive scale, at Newport-Mayo, your Committee thought it advisable to instruct their Secretary to institute a careful personal investigation of the merits of this system, and to report to them his opinion of its efficacy, and its capability of general adoption. In accordance with these instructions, he laid before them a report, in which a full description was given of this process, and a most favourable estimate of its advantages over the system hitherto in use. He stated its superiority to consist in the certainty with which it effected the retting of the flax in 60 hours, where, by the common method, a period of one to three weeks was required, according to the state and temperature of the atmosphere—the uniformity of quality, and neatness of handling, evident in flax so treated—the advantage which arises from this critical operation being constantly carried on by skilled labour, in place of its being vested in the hands of a number of individual farmers and farm-labourers, taking it up, once in the year, as a part of their ordinary routine—the facility afforded to farmers for disposing of their flax crop when pulled, which would, doubtless, tend greatly to increase this branch of culture—the simplicity of the apparatus, and the power of employing the system wherever steam is generated for other purposes—and, what is of very great importance, the ease with which all the seed of the Irish flax crop, estimated at an average of £215,000 annually, could be saved, whereas the greater portion of this is now steeped with the flax, from the ignorance and prejudice of the farmers, or the difficulty, in a wet season, of rippling and drying, in the ordinary way. Your Committee, being fully sensible of the importance of this matter, directed the Secretary's report to be published, for general information; and they pledge themselves to give their most earnest atten-

tion to this subject, and to give their attention to any points connected with it, which may yet require investigation.

Mr. S. K. MULHOLLAND moved the following resolution:—"That the Society, having seen numerous specimens of flax prepared on the patent steeping system of Mr. Schenck, and having minutely inquired into the working of this process, are happy to add their testimony to its utility, and to the importance of its probable effects, in the general improvement of Irish flax; and that the Society trust the patentee will be prepared to submit such terms to the public as may put it within the reach of all who wish to take advantage of it." He said, it gave him great pleasure to do so; but it would have given him greater pleasure if he had seen some more of the landed proprietors present. Meeting after meeting proved that they did not take that interest in the Society which they should; for it was their duty as well as their interest to do all they could, by their presence and otherwise, to promote its usefulness. (Hear, hear.) He would say that this was not a subject which might be called a spinning question—one in which the spinners alone were concerned; for it was rather an agricultural matter. (Cheers.) It was, of course, of greater value, that we should use and manufacture produce here, than send to foreign countries for it; but if the proper steps and assistance were not given towards this end, how was that object to be obtained? He had hoped, also, that the landed proprietors would have followed the example set them by our Noble Viceroy; and shew, by the support and countenance they gave this Society, that they were disposed to lend a hand, in creating that amount of employment which would make the poor man happy and prosperous; and, if this were done, the people who were now given up to faction and were unemployed, would soon give up their mischievous agitation, and turn themselves to honest industry. The nature of the resolution he had moved seemed to open to this Society a new recommendation, a new affair, just now. Small farmers, or persons like himself, felt great trouble in attending to the crop, after it was grown; but Schenck's Patent, he thought, would remove a great deal of objection, on that head. At the same time, he hoped the patentees would open their work to the country, by making it reasonable; for as it was now, it would prove a dead letter. He was glad to see, now present, a gentleman to whom the portion of Ireland in which his services were so conspicuously rendered, was deeply indebted—he meant Sir Richard O'Donnell—(hear, hear)—and as he hoped that gentleman would give to the meeting some information, he would not further occupy their time; and the more especially as the report read contained the views of the Committee. He again regretted the absence of many landed proprietors; but that circumstance must make them the more prize those who did attend—(hear, hear)—and the country would ever feel indebted to them.

Sir RICHARD O'DONNELL then rose and said,—My Lord and gentlemen, I have great pleasure in seconding the resolution; and, in doing so, I shall, with your permission, make a few observations upon that resolution; and not upon it only, but on the circumstances, the prospects, and the condition of this unhappy country, and the sufferings,

the sorrows, and the privations, under which every man in society has been labouring, during the last two years and a-half.—Whether the landed proprietor, the farmer, or the merchant, we have had all deep sorrows and trials to contend against; and, I may also say, no man has had more to deal with, in these unparalleled difficulties, than the humble individual who now addresses you. Great has been the suffering felt by the poor in the West of Ireland—great has been the loss of life, arising from want, and famine, and necessity of every kind; and, therefore, it becomes the bounden duty of every man in the position of responsibility—that responsibility which God had placed him in, whether as a landed proprietor, farmer, or otherwise occupied—to see that the best exertions that were placed in his power had been made available towards the amelioration and benefit of his unhappy country. I am sure that I now address those who feel, from the depths of their hearts, for the sufferings and pangs which our countrymen have been bearing up against, with patience and fortitude, in the deepest of their difficulties; and, therefore it is, that I feel the more deeply indebted to your Society, for having introduced into the West of Ireland, the cultivation of the flax crop, which has brought with it so many blessings to the poor of the district, and has been of so much real benefit to our country. (Hear.) I feel deeply indebted to you, for having brought before my notice—one who was formerly totally ignorant of the value of a flax crop—such a clear, satisfactory, statement of evidence in favour of your plans, as induced me to study the matter carefully, and afterwards to reduce my information to practical working. Your Society, through your intelligent Secretary, enlightened me on a subject of which I knew nothing before, but of the importance of which I am now satisfied; for I may say before you, of the North of Ireland, that your prosperity, and the blessings you all enjoy, more or less, have grown with your flax cultivation and your linen trade. (Hear, hear.) The cultivation of your flax crop—the growth and manufacture of that most valuable article—has been the means of introducing industrial habits among your people, which raise you pre-eminently above the rest of Ireland. It is, therefore, with pride and pleasure I now appear before you, my Lord, and you, gentlemen, to offer my sincere thanks for those benefits which your Society has been the means of introducing to the people of my country. (Hear.) Having said so much on this subject, as a landed proprietor, I now take the liberty, as a Connaught man, who has been taught, by your Society, something of the value of a flax crop—I presume to say to you—you who have so long known the advantages and profits of such a crop—that you have something yet to learn. (Hear, hear.) I take the liberty of telling you, who have been the great promoters of flax cultivation through the country, that you have yet to have your eyes opened to the great value of that crop. Much of the real benefit of the crop is lost to the country; and, not only that, but much of your wealth, in the North of Ireland, has been sent to other countries, to procure those fertilising manures for your land which you permit to be wasted down your streams and drains. (Hear, hear.) I presume, as a Connaught man, to

speak thus—to address myself to those who were my preceptors, in the knowledge of the value of flax;—I presume thus to turn round to my teachers, and say, you have yet to learn much. Now I stand before you—you who are all intelligent men—you to whom I owe so much—I stand before you, and say, that, if there is a social revolution in this country—a fearful revolution, which has brought pain and sorrow into the hearts of thousands of our people—there is also another revolution taking place, and (pointing to large bundles of flax) there is a sample of it—(hear, hear, and a laugh)—coming from Connaught and the West, to shew you what can be done with flax—what will make the worth of flax four times as valuable as the old cultivation of it. (Hear, hear.) I have now told you, frankly, fully, and from my heart, what I owe to your Society. I do not think I would be acting frankly, if I did not freely state what I feel, and give expression to the gratitude which I owe your body; but, while I say this, I would not be just to my own conscience if I did not add, that I owe more to those foreigners who came to my poor, bleak country, and who produced, in Connaught, an article as good as you in Belfast can. (Hear, hear.) I say, I owe a debt of gratitude to these gentlemen, who, unlike you, men of the North, have not been afraid to spend their money amongst us. I would be glad to see some of you in the West, with some of your money; and, if you take a pattern from these foreigners, you will find a field for profit which you may not be able to get at home—(hear, hear, and a laugh)—and you may be sure you will get a sincere and cordial *cassid mille failthe*. (Hear, and laughter.) I owe, then, a deep debt of gratitude to the Messrs. Bernard & Co., who have freely spent their money in our country, and who have brought our flax, which was formerly known only as a byword of disgrace, to such a point, that we can say to you—“Here is as good an article as you can produce.” (Hear, hear.) I need only now hope, that I may have many opportunities of meeting with the industrious honest men of the North, and that my friends, Messrs. Bernard & Co., may always be able to compete with you all. (Hear, and applause.)

The CHAIRMAN said, perhaps Mr. Bernard would be disposed to give some information to the meeting.

Mr. BERNARD said, he did not think he could add anything, for the patent steeping process was fully stated in the report, formerly communicated to the Committee by the Secretary; but, if there were any questions put to him, he would answer them.

CHAIRMAN—The question is, will you lower your prices? (Laughter.)

Mr. BERNARD—I have not heard that any one complains that our prices are so high as to prevent him from coming to us.

CHAIRMAN—I have heard £4 a ton stated as your price for the patent right.

Mr. BERNARD—It is not necessary to name a price here; but, if any one wants to deal with us, we will meet him as low as we can.

CHAIRMAN—I may as well tell you, that in a conversation which I heard on the subject, some gentlemen considered half your charge to be enough.

Sir R. O'DONNELL—He may lower his terms; but let whoever wants to know them, go to him, in the way of business.

Mr. BERNARD—We are very anxious to meet the views of the Society; but, at the same time, we require a certain remuneration for our loss of time and trouble: however, we would be glad to deal as favourably as we could with all who apply to us, and would be happy, if some proposal were made to us.

Mr. S. K. MULHOLLAND said, the people of the North were a very cautious set of men; and until they saw what were the inducements of any project, they would not readily take it up. Now, he suggested, that those gentlemen would open some small establishment, say in Armagh, which would be central for two or three Counties; and then people could judge for themselves of the advantages represented.

Mr. BERNARD said, they would do so, if they thought they would have a chance of benefiting thereby; but they could not leave where they were at present well known, unless some inducement were held out for their so doing.

Sir R. A. O'DONNELL (to Mr. Mulholland)—If you build a concern here, I will undertake to work it for you. (A laugh.)

Mr. MULHOLLAND—I would think it a very great injustice to your people to take such a gentleman from them. (Renewed laughter.)

Mr. GREER—It is stated here, that there would be a great saving by taking the Messrs. Bernard's course. Now, what is the expense of the old way, and the expense of the new; and what are all the differences in the matter?

Mr. MACADAM said, that the samples of flax exhibited in the room shewed for themselves as to the quality of the fibre; and, in order to test its yield in hackling, and its strength when spun into yarn, a small spinning had been tried at the Durham-street mill. A small portion of the yarn was also hoiled, in order to ascertain if the green colour of the flax, as steeped or dried by artificial means, could be readily got rid of in the hoiling of the yarn. He then read the following letter with reference to the yield of the flax when hackled:—

“Manchester, Dec. 13th, 1848.

“DEAR SIR,—We have, this morning, your letter of the 10th inst., with an inquiry respecting the yield and quality of the samples of Mayo flax, treated by the new method, adopted by Messrs. Bernard, Schenck, & Co. We are most happy to state that, so far as we have been able to judge, the result has been most satisfactory. We have found greater regularity in the lengths than from foreign flax, which is of great importance to us in cutting; and quite as much regularity in the quality. The yield has been from 8 to 10 per cent. more than from the average of the Irish flax we have used, and the sorting quite as satisfactory. We hope the landowners of Ireland may be induced to extend the cultivation of flax on a large scale in some of the more Southern and Western districts, by which means a large population would be employed, and we should be independent of any supplies from the Continent.—We remain, dear Sir, your most obedient servants,

“WILLIAM RENSHAW & Co.

“James MacAdam, Esq., jun., Belfast.”

He then submitted the following, with respect to the spinning of the yarn, and the effect of the boiling process:—

"Durham-street Mill, Belfast, 15th December.

"DEAR SIR,—Herewith I send you a few hanks (5½) of 115 lea linen yarn, spun from the sample of flax you sent. One of the hanks is boiled, but it did not get justice, as I only got the yarn off late yesterday; however, it is quite sufficient to shew, that there can be no objection to it on the score of boiling.—I am, dear Sir, yours, truly,

"JOHN CRAWFORD.

"James MacAdam, jun., Esq."

LORD DOWNSHIRE—You have not stated what is the estimated expense of the steeping process?

MR. MACADAM replied, that the calculation he had made at Newport was, that from the time the flax, as pulled and dried by the farmers, was delivered in the yard of the Company, the entire expense of threshing out the seed, steeping the flax, drying it, and scutching it in the mill, amounted to 11*l.* per ton in the fibre—an amount certainly less than the cost of the operations as ordinarily conducted.

MR. MULHOLLAND again suggested to the Messrs. Bernard, that if they wanted to succeed here, they should first open a small establishment, from which people would be able to judge for themselves.

In reply to the CHAIRMAN and Mr. W. G. ANDREWS,

SIR RICHARD O'DONNELL said, the Messrs. Bernard & Co. had been working at his place for at least five or six months; and, during all that time, in which he had visited the establishment almost daily, he could say, that not a single vat had been spoiled yet. (Hear.) The time of steeping was 60 hours.

PROFESSOR HODGES said, he agreed with a great deal of what had been mentioned on the subject of the patent alluded to. He had had an opportunity of seeing an experiment made with it, in a small establishment in Belfast; and he concluded, from what he had seen there, that it was one of the greatest improvements in the management of flax that had been made during the last century. (Hear.)

MR. COATES moved that the Marquis of Downshire do leave the Chair.

The CHAIRMAN said, before that motion was put, he was going to submit to the meeting, that a Sub-Committee should be appointed, to consult with the patentees as to the terms on which they were prepared to meet parties who wished to erect steeping establishments.

MR. S. K. MULHOLLAND thought it might be as well to appoint the Committee at once.

A Committee was then appointed, consisting of Dr. McKibbin, Dr. Hodges, Messrs. J. Charters, J. Hind, J. Campbell, R. Hull, J. Herdman, and J. Grimshaw, jun.

SECRETARY'S REPORT TO THE COMMITTEE
OF THE
ROYAL SOCIETY
FOR
THE PROMOTION AND IMPROVEMENT
OF THE
GROWTH OF FLAX IN IRELAND,

ON THE AMERICAN PATENTED SYSTEM FOR STEEPING FLAX, AS NOW IN
OPERATION AT NEWPORT, MAYO.

IN connexion with the inspection of the Society's Western and Southern districts, I was instructed by the Committee to examine and report upon the system of steeping flax, patented in America, and introduced into this country by Mr. Schenck, of New York, last year.

The Committee will remember, that, on the first communication, by the patentee, of this process, about eighteen months ago, partial trials of its efficiency were made, on a small scale, in Belfast, the Secretary and Mr. Haslett, one of the Society's Agriculturists, having superintended the operations. The result satisfactorily established the truth of the patentee's declaration, that flax could be as thoroughly retted in sixty hours, by steeping in vats in which the water was maintained at a temperature of 90 degs. Fahrenheit, as it is generally, on the usual system, in from seven to twenty one days. Subsequent comparative trials of the two modes, by a man of Mr. Davison's, County Monaghan, confirmed this fact, and established the further important point, that the yield of fibre from the straw is greater by the patent process than by the ordinary method; the amount of flax from 112lbs. of straw being, by the former, 24lbs., by the latter, 20lbs.—a difference of 20 per cent. in favour of the American system. From experiments made by Messrs. W. Reushaw & Co., of Manchester, it further appeared, that of those two samples, the former spun to 101 lea yarn, the latter to 96 lea.

Notwithstanding the favourable nature of these results, the Committee wisely declined pronouncing upon the merits of the invention, until it had been tried upon a large scale, as, in all cases of the kind, petty and isolated trials are, at the best, unsatisfactory. It was desirable to ascertain the practicability of conducting the operations of steeping and drying on a more extended basis, in an establishment specially erected for the purpose, where the efficiency and cost of the process could alike be determined, in operating on a large quantity of the material. Mr. Schenck, the patentee, having entered into arrangements with Sir Richard A. O'Donnell, Bart, of Newport, Mayo, and being associated with Messrs. Bernard and Koch, of Manchester, an establishment for working out the system has been set on foot, in that locality, within the last few months.

I was, therefore, instructed by the Committee to lay before them a report on this undertaking, which I shall now proceed to do, adding some observations that I feel called upon to make, with reference to its general value and applicability.

The premises in which the process is carried on are situated on the Newport River, about half-a-mile from the village, and at a short distance from a fine scutch-mill, of twelve stands, driven by water-power, which has been rented by the Company, from Sir Richard O'Donnell. The tenements, containing the vats and drying shelves, are simple wooden sheds, of cheap construction. In one end of the building are four vats, set parallel to each other, the length of the house. They are made of inch deal, in the form of a parallelogram, fifty feet long, six broad, and four deep. There are false bottoms, perforated with holes. Underneath these are introduced the steam-pipes, crossing the vats, and having stop-cocks at their entrance, by which the steam can be let on from the main pipe, as required. The steam is generated in a small boiler, which also serves to turn two hydro-extractors, a patent apparatus used to drive off a portion of the water with which the flax is saturated, on being taken from the vats. The flax is packed into the empty vats, on the butt ends, in a half sloping position, precisely as in the case of a steep-pool, only one layer being the depth. The water is then let in, and a frame fastened over the top of the flax, answering the end of stones and straw, or sods, in the steep-pools—the prevention of the rising of the flax in the course of fermentation.

The steam is then let into the pipes by turning the stop-cocks, and the water is some 18 or 20 hours in becoming heated to the required point—85 degs. to 90 degs. The fermentation then commences, and no further steam is required, the action going on until the flax is thoroughly retted, which is in 40 hours afterwards, being 60 from the time of the admission of the water. It is worthy of remark, that if the water be heated before the flax is put into the vat, or if the heat be raised above 90 degs., the process is not in the least hastened, but, on the contrary, the fermentation is rather retarded. The footsteps of nature must be followed, and the heat gradually communicated to the water; otherwise the uniformity of watering, and the preservation of quality and colour, cannot be fully realised. At the end of the 60 hours, the flax is taken out, the water allowed to run off, and the vat permitted to cool. The same process is then repeated, with fresh water and fresh flax. When taken from the water, the flax is packed in the hydro-extractor, which is a round vessel of iron, made to revolve by steam-power with great velocity, the water being driven out of the flax on the principle of centrifugal force. Thirty beets are placed in this machine at a time, and about 20lbs. of water are extracted in 3 to 5 minutes. A few hours suffice for the contents of a vat, each vat containing two tons of flax straw. The hydro-extractor only separates a portion of the water; the flax now remains to be thoroughly dried. In Summer, or, indeed, for six months in the year, this can be accomplished as usual, by spreading on grass-land, in the open air. During Winter, however, it is necessary to find other means of drying. A shed has, therefore, been erected, communicating by doors with the vat-house, filled

with ranges of shelves, composed simply of railings of lathwood, in five or six tiers. The flax is spread lightly along these shelves by women, and the house is heated by steam-pipes. This house is capable of drying the full of one vat *per diem*. The flax, when dried, is made up in small beets or handfuls, of a size suited for feeding into the breaking rollers of the mill.

About ten vats per week can be steeped in this establishment—say twenty tons weight of straw, and producing say two and a-half to three tons of fibre. Thus, in one year, such an establishment would be capable of turning out 120 to 150 tons of flax for market, being the produce of 400 to 500 statute acres. The fuel used for the boilers is principally shoves, with a small quantity of turf. Mr. Bernard estimates the cost of steeping, drying, heating, and scutching the flax, at £10 to £11 per ton, which is £3 per statute acre. Subtracting, say 10d per stone, or 6s per cwt., for scutching, the cost of steeping and drying would thus appear to be about 24s per acre—a sum certainly less than the usual estimates of these operations, as commonly performed by farm labour. The number of persons employed in the steeping and drying-houses, and generally about the establishment, is forty—ten men and thirty women. The scutch-mill contains twelve stands, and the usual turn-out is three and a-half stones to each stand *per diem*, or forty-two stones for the whole. Thus, this mill would be barely sufficient to scutch all the flax that could be steeped in the other establishment; it would require about eighteen stands to do so effectually. In the mill, twelve men and eleven women are employed; making, in all, twenty-two men and forty-one women, or sixty-three hands, as a total employed in both branches of the establishment. About £1,500 of wages is distributed per annum.

At the time of my visit, the Company were chiefly occupied in retting and scutching some flax which had been already steeped, in the usual way, last year; but, owing to the lateness of the harvest, had not been sufficiently done, and was now being re-steeped in the vats. The fibre was rather coarse, but very strong, and with a good deal of nature. Of this year's crop, dried on the Courtrai system, a small quantity had been steeped and scutched. The samples produced are of excellent quality, some of them apparently equal to the very finest specimens of Irish growth. Hackles are kept at the establishment, that the flax may be tried after scutching. A small quantity has already been shipped to England. The flax is brought into the precincts by the farmers, just as pulled and dried in the field, on the Courtrai system, or a rude imitation of it. The seed remains on it, and it is stacked in long ricks, thatched with inferior flax, and tied down with coarse ropes, twisted out of the scutching tow. A bottom of stones keeps the rick dry, and a small channel is cut round each, to let away the rain. When a stack is taken down, the seed is beaten off and cleaned, the best of it reserved for sowing, and the rest available for feeding or crushing, for the former of which purposes the husks and chaff are also valuable. Mr. Bernard estimates the average produce of good seed as seven bushels per statute acre, besides light seeds and chaff. It is worthy of remark, that the flax dried on the Courtrai mode, and steeped on the patent system, produces a fibre of more than average excellence of quality, while, on the same system, almost invariably here,

when treated in the usual way of steeping, whether in the Autumn of the same year, or the Summer of the subsequent one, the quality of the fibre has been deteriorated, and scarcely an instance of a fine sample has been known. Hence the Society had admitted the fact of deterioration, to a certain extent, as produced by the Courtrai mode of treatment, but had advised its adoption, to a certain extent, on account of the value of the seed thus saved.

I shall now allude to the advantages of this method of steeping:—

1. The objections which have been made to saving the seed by rippling, from unfavourable weather for drying the bolls, scarcity of hands to ripple and steep in one day, careless labourers at the combs, by which the ends of the flax have been injured, expense of drying the bolls, &c., &c., are all obviated; since the simple drying of the entire plant, as pulled, and the after-thrashing out of the seed, is all that is required. Hence, were this mode of steeping generally adopted, the seed of the entire Irish flax crop could be saved, with the greatest ease, every year. The value of this may be estimated, by considering the entire produce of an average crop of seed. Taking 75,000 acres as the average breadth of flax sown, and Mr. Bernard's estimate of 7 bushels good seed per acre, we have, for the whole crop, 525,000 bushels—of this quantity there would be required to sow the same breadth next year, 187,500 bushels, leaving available for feeding or crushing 337,500 bushels. The value of 187,500 bushels, for sowing, at 10s, would be £93,750; the value of 337,500 bushels, for feeding or crushing, at 5s, would be £84,375; the value of the light seeds and chaff of 75,000 acres, at 10s, £37,500; being, per annum, a total realisation of £215,625.

The value of the American mode of steeping, or its equality, in point of efficiency and economy, to the usual mode, once admitted, I conceive the above facts of the most extreme importance to the country, as realising such a large addition of natural wealth, now, to a great extent, neglected and destroyed.

2. The reducing, to a certainty, an operation hitherto attended with risk, owing to the fluctuations of temperature in the air and water, and the comparative skill of farmers, and attention of their labourers. It is well known to every one who has managed flax, that one sultry night, while it is in the steep, and nearly retted sufficiently, is enough to carry the fermentation beyond the safe point, and to weaken the fibre, so as to cause after-loss in the scutching. So much is this feared by farmers, that almost all flax is under-watered; and, although much of it is afterwards mannered on the grass, so as to obviate this fault, yet a great proportion is brought to market with the shoves still unseparated, in bits, on the fibres. The uniform temperature of the water, as heated by steam, ensures the uniform retting of the flax, while the hands become skilful in knowing the exact point at which the process should be arrested. In all they have steeped, the Company have never had any but one vat full, which was not done with precision.

3. A uniformity of quality, and a neatness of handling, is much more likely to be obtained from a set of persons constantly engaged in working with flax, throughout the year, than from farm labourers, taking up the steeping and grassing of flax once in every twelvemonth, and reducing a critical

and semi-chemical operation to a mere item in the usual work of the farm. This is very evident, and requires no demonstration.

4. It has been frequently acknowledged that flax would be much more generally grown, if a market could be offered for it as pulled; farmers often objecting to the trouble and risk entailed in the subsequent manipulations. In recognition of this, the Society, five years ago, encouraged the establishment of flax factors in Ireland. This branch of trade had to be given up, owing to the difficulty those who embarked in this enterprise experienced, of managing a large quantity of flax, steeped green. The same objection does not exist in the case of the American system, since the flax, when dried in the field and stacked, can be kept in this state without any deterioration of quality, until it be convenient to steep it. Hence the greatest inducement exists for capitalists embarking in this trade, from the indestructible nature of the material on which they have to operate.

5. Where steam exists, as a motive power for any kind of machinery, vats can be erected at small cost, and the spare steam used to heat them, without the expense of a special boiler and apparatus. Hence the easy applicability of this system, in almost all parts of the country, and its special adaptation, when a scutch-mill is driven by steam; the fuel being the shoves produced in the scutching operation. The mill would thus work up the flax steeped in the vats, and the steam generated by the shove fuel would equally drive the engine to scutch the fibre and heat the water to rot the stems.

These are the chief points on which I would found an estimate of the advantages likely to be derived from the general adoption of this system of steeping. There are other minor points, of considerable interest, such as the economy of the steep-water for the purpose of manure, the employment of a number of hands throughout the year permanently, where hitherto the management of flax has only formed an item of the usual field labour of the agricultural population; the training of these in a semi-manufacturing occupation, inducing habits of system and industry in remote districts, where the desultory character of farm-work has not this desirable effect; the uniformity and superiority of handling which must raise the character of Irish flax, and induce its consumption by the continental spinners. These are a few of the good effects which might be expected to arise.

It may appear to the Committee, that I have taken a rather sanguine view of the merits of this system; but I simply speak from the conviction, induced by personal observation, which conviction only came after I had rejected, as a matter of caution, the testimony offered by the isolated and petty experiments formerly made, but had recognised its results in the operations now being carried on at Newport, County Mayo, in a district where every difficulty had to be contended with, and where, but three years ago, the cultivation of flax, except for the most limited home-use, was quite unknown. In my opinion, the only points now necessary to determine are, whether this process exerts any weakening effects on the fibre, and whether the linen made from it is as readily and purely bleached as on the ordinary process; but if, after spinning, weaving, and bleaching, the linen made from it be pronounced, by competent judges, as equal to that made from flax steeped in the ordinary

way, I shall have no further hesitation in recommending the Committee to pronounce in its favour, believing, as I do, that it is calculated to effect a complete revolution in the cultivation and preparation of flax in Ireland.

JAMES MACADAM, JUN., Secretary.

Belfast, 24th Oct., 1848.

SCHENCK'S PATENT FOR STEEPING & PREPARING FLAX.

(From *The Irish Agriculturist*, of December 8, 1848.)

TO THE EDITOR OF THE IRISH AGRICULTURIST.

SIR,—The vast importance of this discovery, and the changes I believe it destined to effect in the Irish flax trade, induce me to trespass on your valuable space, with a few remarks upon that subject. The many great advantages, both in a national point of view and as a matter of private speculation, certain to accrue from the general adoption of Mr. Schenck's patent, I believe to be a sufficient apology for this intrusion.

Having met the patentee soon after his arrival in Ireland, I at once became a convert to his views, being fully convinced of the practicability of his plans and the value of his discovery. I have since had an opportunity of seeing the system successfully carried out, during my residence as Agricultural Instructor, in the neighbourhood of Newport, County Mayo, where, in conjunction with his partners, Messrs Bernard and Koch, late of Manchester, Mr. Schenck is carrying on an extensive establishment for steeping and preparing flax, according to the patent process.

The advantages consequent on the adoption of this system are:—

1st. That by relieving the farmer of the risk he incurs in the steeping and management of the crop, the great objection to the cultivation of flax, in the South and West of Ireland, where, in most instances, both soil and climate are so well suited to it, will be removed, and I have no doubt, that this discovery will ultimately produce the result which the great and unceasing exertions of the Royal Flax Society have but partially accomplished, viz.,—the general cultivation of flax, on all soils adapted for its growth.

2d. The seed of the entire crop can be saved in superior condition, without at all deteriorating the quality of the fibre. The great importance of this is so obvious, that it is unnecessary to enter into calculations on the subject; suffice it to say, that even on the breadth sown last year, the national gain would be upwards of £215,000.

3d. The production of a superior quality of fibre, some of which has been valued at £100 per ton.

4th. A much larger yield of fibre from the straw,—it being ascertained by fairly conducted experiments, that the patent process produced 4lbs. of dressed flax from the hundred of straw more than the same quantity treated according to the most approved practice of the old system.

5th. The neatness of bandling, ensured by the bands employed being

trained to their business, as a manufacturing process, instead of the slovenly and careless manner in which the several operations are generally performed, as they occasionally occur in the routine of farm labour. This is a very important advantage, as the immense loss sustained in working badly handled flax is well known to all who are acquainted with flax-spinning.

6th. As a means of giving profitable employment to our labouring population of both sexes.

The establishment at Newport (which is calculated to be capable of turning out one hundred and twenty tons of dressed flax annually) employs twenty men and sixty women, in the several processes of steeping, drying, breaking, and scutching, exclusive of the agricultural employment given in putting down of the crop, weeding, pulling, and carting.

The quantity of flax annually consumed in the United Kingdom is calculated to be about one hundred and ten thousand tons, the greater part of which is imported from Russia, Belgium, &c.; but believing that Ireland, with the aid of Mr. Schenck's discovery, will ultimately not only supply the entire quantity, but also a surplus for exportation, we shall calculate the amount of employment capable of being given on the quantity consumed at present, before it comes into the hands of the spinner.

Taking our knowledge of the working of the establishment at Newport, as data, to supply this amount would require seven hundred and fifty establishments, of equal extent, giving employment to fifteen thousand men, and thirty thousand women, and disseminating wages to the amount of £1,125,000 annually.

It may be argued, that this will be balanced by the loss of the employment given in the management of flax on the old plan. I believe this to be a wrong conclusion. The employment given in that way, occurring only at occasional periods, amongst agricultural operations, is not calculated on as a means of support by any portion of the working classes; whilst, by the general use of the patent process, the means of constant employment, at fair wages, will be afforded to thousands.

As to the additional produce obtained by the system, I have already stated, that it has been proved by experiment to be one-fifth more than by the old method; and taking the average quantity of flax, grown in Ireland, at thirty thousand tons, shews the enormous quantity of six thousand tons, which, at £60 per ton, is £360,000 annually lost. This is calculating the gain, as against flax handled in the very best manner on the old plan; and it is obvious, that from want of skill in steeping, and slovenly management, the loss in general is much greater.

The gain from superior quality of the article produced is not so easily reduced to a certainty, but taking it at £7 per ton, which is much under the reality, we have £210,000.

Having shewn a few of the advantages, in a national point of view, likely to arise from the adoption of Mr. Schenck's system, I shall now beg leave to call attention to it, as a field for enterprize, and the profitable investment of capital.

In order to place this part of our subject in the clearest possible light, we

shall first calculate the cost of erecting the necessary apparatus; next, the expense of working, and endeavour to shew, as near as possible, the profits that may reasonably be expected by parties possessing sufficient capital and enterprise to embark in this new branch of manufacture.

Assuming, again, as the basis of our calculations, the experience we have of the erection and working of the establishment, now in operation at Newport, Pratt, we shall say (when water-power cannot be had) :—

A 10-horse steam engine and boiler.....	£240	0	0
4 steeping vats, 50 feet 6 x 4, with heating pipes, &c., complete	150	0	0
Drying sheds, &c.....	60	0	0
Breaker	45	0	0
12 scutching stands, with machinery complete.....	150	0	0
Sheds.....	60	0	0
	£705	0	0

EXPENSES OF WORKING :—

480 Irish acres of flax, at £3 per acre.....	£3,840	0	0
Wages and repairs.....	1,500	0	0
Interest on capital invested, say £5,000, at 5 per cent.....	250	0	0
License to patentee, £3 per ton.....	360	0	0
Contingencies.....	200	0	0
	£6,150	0	0

RETURNS :—

Seed from 480 acres, at £3 per acre.....	£1,440	0	0
120 tons dressed flax, at £60 per ton.....	7,200	0	0
15 tons tow, at £15 per ton	225	0	0
	£8,865	0	0
Cost,	6,150	0	0

Annual profit, £2,715 0 0

Being about 50 per cent. on the capital invested.

Mr. Robinson, of Belfast, proposes to erect machinery, capable of working one hundred Irish acres of flax per annum, according to Mr. Schenck's system, for the following, viz. :—

4 circular vats, 2,000 gallons each, with steam pipes.....	£54	0	0
Breaker and scutching machinery.....	90	0	0
Steam boiler and pipes.....	70	0	0
Fixtures for drying-room.....	26	0	0
	£240	0	0

In selecting a site for an establishment of this description, it will, of course, be necessary to choose a locality, the soil of which is adapted for the growth of flax. Whether it has or has not been a flax growing district is quite immate-

rial, as, under this system, instead of flax being a troublesome crop, requiring much skill and attention to make it profitable to the farmer, it is rendered one of the least so that he can cultivate.

The margin of a river or running stream, with a sufficient supply of water, free from iron, or other mineral impregnation, is the proper site; and, if there is also sufficient fall to make water the motive power for driving the machinery, so much the better. If steam must be the power employed, the shoves will supply sufficient fuel to heat both the boiler and the vats.

There are, of course, many considerations to be taken into account, in selecting a neighbourhood in which to commence an establishment of the kind, such as cheapness of labour, means of conveying the article to market, &c.; these are minor matters, and can only be judged of as they may present themselves.

To the landed proprietors of Ireland, this system holds out great advantages, of which, I trust, they will avail themselves with promptitude and energy. Upwards of half the entire rental of Ireland is annually paid to foreigners for flax, flaxseed, and oil-cake. Now, if Ireland, by the general use of Mr. Schenck's process, be capable of producing more than the quantity of these several products of the flax crop, annually required in the United Kingdom, the great benefit of retaining such an immense sum in this impoverished country is plain. Let, then, every landlord in Ireland, who possesses land suited to flax, put up a concern of this description, which will employ a large number of those at present a burthen on the country, enable the farmers to meet their rents and other demands, and, at the same time, return a large percentage on the capital invested.

That these are not speculative opinions, but real facts, is easily proved by reference to the establishment at Newport, where that excellent man and enlightened landlord, Sir Richard A. O'Donnell, Bart., his tenants, and the working classes on his property, are now reaping the reward which the truly liberal encouragement and assistance Sir Richard has rendered to the Company so well deserve.

The linen trade of Ireland has much to contend against, in the opposition of foreign manufacturers, the duties imposed by the tariffs of Continental nations, and uncertainty in the supply and price of the raw material. The extremely low prices of cotton fabrics is also a serious drawback on the demand for linens: here the linen manufacturer labours under great disadvantages. The raw material of cotton being raised by slave labour, is always comparatively cheap (the present price of cotton wool being from 3d. to 3½d.)

Against all these disadvantages, how are we successfully to contend? By adopting every improvement, and rendering available every useful discovery connected with this branch of manufactures. If this be done, I believe that the superiority of Ireland, as a linen-producing country, will enable our manufacturers to outstrip their rivals of other nations, and place the character of Irish linen before that of any other country in the markets of the world.

Should the foregoing have the effect of calling the attention of men of means and energy to this new field for profitable exertion, and thereby facilitate the development of one of the most important resources of this favoured but un-

fortunate country, the writer will consider himself sufficiently rewarded.—I am, Sir, your obedient servant,

JOHN HAGAN,
Agricultural Instructor.

Lakeview, Hillsborough, December 2, 1848.

COPY OF A LETTER FROM MR. HOWIE, BLEACHER.

Old-Park, March 10, 1849.

DEAR SIR,—I have bleached the two samples of yarn received from Mr. MacAdam, one of which was spun from your Newport flax, the other from Irish flax, on the old plan. I find your yarn to bleach easier than the other, and believe it would be a gain to bleachers to bleach cloth made from such yarns. I find no more loss in weight or strength than in ordinary yarns.—Yours, very truly,

ROBERT HOWIE.

R. B. Schenck, Esq.

Copy of a letter from the Secretary of the Royal Flax Improvement Society, to George Robinson, Esq., of Drimoleague, Dunmanway, in reply to an inquiry from that gentleman, as to the Committee's opinion of the value of the patent steeping system.

Belfast, 26th March, 1849.

SIR,—I have been absent, in London, for the last three weeks, which will account for the delay in replying to your letter.

With respect to the patent system of steeping, I am now able to state, that we can have no further hesitation in recommending its adoption, as the trials of the flax so treated, after sale to several spinners here, and in England and Scotland, have proved perfectly satisfactory.

I really do not see any way in which capital could be more profitably invested, at the present time, as County Mayo flax, steeped on this system, has brought from £50 to £76 per ton here, lately, while the growth of the same district, steeped in the usual way, has been selling at £23 to £38.

The district in which you reside is very well adapted for flax culture, and the establishment of a scutch mill, and steeping vats, would ensure a large annual growth at any time, but more especially since the loss of the potato, and the depreciation in value of farm produce.—I am, Sir, your very obedient servant,

JAMES MACADAM, Jun., Secretary.

George Robinson, Esq.

*Laboratory of the Chemico-Agricultural Society of Ulster,
Belfast, April 13, 1849.*

DEAR SIR,—I have, on several occasions, stated my opinion of the value of the improvements which you have succeeded, by your patent process, in introducing into the management of the flax crop. I sincerely hope, that you may be enabled to obtain the adoption of your method, in our flax-growing districts, as I am persuaded that it would do much to increase the profits derived from the cultivation of that important crop. I am glad that you are about to commence operations in the South of Ireland, where the soil appears so well adapted to the growth of flax, but where the hopes of

the farmer are so frequently disappointed by the uncertainty which has hitherto attended its proper preparation for the market.

I may mention, that I have conversed with many of our most experienced spinners, and that they speak in very high terms of the importance of your process.—I remain, dear Sir, yours, faithfully,

JOHN F. HODGES, M.D.,

Professor of Chemistry, Royal Belfast College.

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